

CLAIMS

1. Apparatus, comprising a moulding unit (3; 3a) having a punch (5; 5a) and a mould cavity (4; 4a) movable along a path between an open position in which said punch (5; 5a) and said mould cavity (4; 4a) are distanced apart from each other to receive a dose (D) of plastics therebetween, and a closed position in which said punch (5; 5a) and said mould cavity (4; 4a) interact to form an item by pressing said dose (D), said punch (5; 5a) being kept not above said cavity (4; 4a) along said path.
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2. Apparatus according to claim 1, wherein said punch (5) is placed under said cavity (4).
3. Apparatus according to claim 1, wherein said punch (5a) and said cavity (4a) are placed on a common horizontal plane.
- 15 4. Apparatus according to any preceding claim, wherein said mould cavity (4) is movable between said closed position and said open position.
5. Apparatus according to any preceding claim, wherein said punch (5; 5a) is movable between said closed position and
20 said open position.
6. Apparatus according to any preceding claim, wherein said moulding unit (3; 3a) is mounted on a rotating carousel (2).
7. Apparatus according to any preceding claim, and further
25 comprising a supporting arrangement for supporting said dose (D).
8. Apparatus according to claim 7, wherein said supporting arrangement extends externally of said mould cavity for supporting said dose (D) between said punch (5; 5a) and
30 said mould cavity (4, 4a) in said open position.
9. Apparatus according to claim 7 or 8, wherein said supporting arrangement is driven by cam means (19; 19a).
10. Apparatus according to claim 9, wherein said cam means (19a) is fixed to said punch (5a).

11. Apparatus according to claim 9, wherein said cam means (19) is fixed to said mould cavity (5).
12. Apparatus according to claim 9, as claim 7 is appended to claim 6, wherein said cam means (19) is fixed to said carousel (2).
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13. Apparatus according to any one of claims 7 to 12, wherein said supporting arrangement comprises a pair of rods (11) connected to a respective pair of levers (16a, 16b) hinged at a base body, each lever (16a) of said pair of levers (16a, 16b) being connected to the other lever (16b) of said pair of levers (16a, 16b) by a connection rod (25).
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14. Apparatus according to any one of claims 7 to 13, wherein said supporting arrangement is oscillatable by gear means (38, 39).
15. Apparatus according to any one of claims 7 to 14, wherein said supporting arrangement comprises a supporting member (11; 11a) which is movable between a dose-receiving configuration in which said supporting member (11; 11a) is so arranged as to retain said dose (D) and a dose-delivering configuration in which said supporting member (11; 11a) is so arranged as to deliver said dose (D) to said moulding unit (3; 3a).
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16. Apparatus according to claim 15, as appended to any one of claims 9 to 12, wherein said cam means (519) has a first portion (560) for driving said supporting member and a further supporting member in said dose-receiving configuration and a second portion (561) for driving said supporting member and said further supporting member in a dose-pinching configuration in which said dose (D) is pinched between said supporting member and said further supporting member, said second portion (561) being adjacent to said first portion (560).
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17. Apparatus according to claim 15 or 16, wherein said supporting member (11a) is oscillatable parallelly to an
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axis along which said punch (5a) and said mould cavity (4a) are movable.

18. Apparatus according to any one of claims 15 to 17, wherein said supporting member is made from porous material.

5 19. Apparatus according to any one of claims 15 to 18, wherein said supporting member comprises a tubular supporting member (211) having holes (212a) through which a fluid can be injected toward said dose.

20. Apparatus according to any one of claims 15 to 19, wherein 10 said supporting member is made from thermally substantially non-conductive material.

21. Apparatus according to any one of claims 15 to 20, wherein said supporting member (11a, 51) is substantially L-shaped.

22. Apparatus according to any one of claims 15 to 21, wherein 15 said supporting member is coated by a substantially non stick material.

23. Apparatus according to any one of claims 7 to 22, wherein said supporting arrangement is mounted on said punch (5).

24. Apparatus according to any one of claims 7 to 22, wherein 20 said supporting arrangement is mounted on said mould cavity (4a).

25. Apparatus according to any one of claims 7 to 24, wherein said supporting arrangement is actuated along said path independently of said mould cavity (4) and/or said punch (5).

26. Apparatus according to any one of claims 7 to 25, as claim 7 is appended to claim 6, wherein said supporting arrangement is mounted on said carousel (2).

27. Apparatus according to any preceding claim, and further 30 comprising a dose-delivering mouth (48; 48a; 48b) of an extruder interposed between said punch (5) and said mould cavity (4) in said open position.

28. Apparatus according to claim 27, wherein a severing arrangement (46; 49; 49a) co-operates with said dose-

delivering mouth (48; 48a; 48b) so as to sever said dose from said extruder.

29. Apparatus according to claim 28, wherein said severing arrangement (46; 49; 49a) is mounted on said moulding unit 5 (3; 3a).
30. Apparatus according to claim 28 or 29, wherein said severing arrangement (46) is rotatable around a respective axis (Z2).
- 10 31. Apparatus according to claim 30, wherein said severing arrangement (46) is driven by an independent motor unit.
32. Apparatus according to any one of claims 28 to 31, as claim 27 is appended to any one of claims 15 to 22, wherein said severing arrangement (46; 49; 49a) is provided with a blade (46) connected to said supporting member (11).
- 15 33. Apparatus according to any one of claims 28 to 32, wherein said severing arrangement is provided with a knife (49; 49a) mounted on said punch (5; 5a) or on said mould cavity (4; 4a).
34. Apparatus according to any preceding claim, wherein in said 20 open position in which said punch and said mould cavity are distanced apart from each other a plurality of doses (Da, Db; 309, 310) of plastics is placed between said punch and said mould cavity, so as to interact when said punch and said mould cavity are brought in said closed position.
- 25 35. Apparatus, comprising a moulding unit (3; 3a) having a punch (5; 5a) and a mould cavity (4; 4a) movable between an open position in which said punch (5; 5a) and said mould cavity (4; 4a) are distanced apart from each other to receive a dose (D) of plastics therebetween, and a closed 30 position in which said punch (5; 5a) and said mould cavity (4; 4a) interact to form an item by pressing said dose (D), a supporting arrangement extending externally of said mould cavity (4; 4a) for supporting said dose (D) between said punch (5; 5a) and said mould cavity (4; 4a) in said open

position and oscillatable by movable cam means (19; 19a).

36. Apparatus according to claim 35, wherein said cam means (19) is fixed relative to said punch (5).

37. Apparatus according to claim 35, wherein said cam means (19; 19a) is fixed relative to said cavity (4; 4a).

38. Apparatus, comprising a pair of rods (11) for supporting a dose of plastics between a punch and a mould cavity, said pair of rods (11) being connected to a respective pair of levers (16a, 16b) hinged at a base body, each lever (16a) of said pair of levers (16a, 16b) being connected to the other lever (16b) of said pair of levers (16a, 16b) by a connection rod (25).

10 39. Apparatus according to claim 38, and further comprising cam means (28, 29) associated to a lever (16a) of said pair of levers (16a, 16b) to move said pair of levers (16a, 16b) between a dose-receiving position in which a dose (D) of plastics is received on said pair of rods (11) and a dose delivering-position in which said dose (D) is delivered between said punch and said mould cavity.

15 40. Apparatus according to claim 39, wherein said connection rod (25) is hinged to an end portion of said lever (16a) and to an intermediate portion of a further lever (16b) of said pair of levers (16a, 16b).

20 41. Apparatus, comprising a moulding unit (3a) having a punch (5a) and a mould cavity (4a) movable along an axis between an open position in which said punch (5a) and said mould cavity (4a) are distanced apart from each other to receive a dose (D) of plastics therebetween, and a closed position in which said punch (5a) and said mould cavity (4a) interact to form an item by pressing said dose (D), a supporting arrangement (11a, 216) for supporting said dose (D) between said punch (5a) and said mould cavity (4a) and having a member (11a) oscillatable parallelly to said axis.

25 42. Apparatus according to claim 41, wherein said axis is

substantially horizontal and said member (11a) is oscillatable on a substantially horizontal plane.

43. Apparatus according to claim 41 or 42, wherein said member (11a) is fixed to a lever (216) capable of actuating said member (11a) between said open position and said closed position, said lever (216) comprising a first arm (50) substantially parallel to said member (11a) and a second arm (51) joining said first arm (50) and said member (11a).

10 44. Apparatus according to claim 43, wherein said second arm (51) is substantially parallel to said first arm (50).

15 45. Apparatus, comprising a moulding unit having a punch and a mould cavity movable between an open position in which said punch and said mould cavity are distanced apart from each other to receive a dose of plastics therebetween, and a closed position in which said punch and said mould cavity interact to form an item by pressing said dose, a supporting arrangement (111) for supporting said dose between said punch and said mould cavity and oscillatable by gear means (38, 39).

20 46. Apparatus according to claim 45, wherein said moulding unit is mounted on a carousel rotatable around an axis, said gear means (38, 39) comprising first gear means (38) associated to said moulding unit and second gear means (39) stationary with respect to said carousel.

25 47. Apparatus according to claim 46, wherein said supporting arrangement comprises a supporting member (111) oscillatable on a plane substantially perpendicular to said axis.

30 48. Apparatus, comprising a moulding unit having a punch and a mould cavity movable along an axis between an open position in which said punch and said mould cavity are distanced apart from each other to receive a dose of plastics therebetween, and a closed position in which said punch and said mould cavity interact to form an item by pressing said

dose, a supporting arrangement for supporting said dose between said punch and said mould cavity, said supporting arrangement comprising a supporting member of porous material.

5 49. Apparatus, comprising a moulding unit having a punch and a mould cavity movable along an axis between an open position in which said punch and said mould cavity are distanced apart from each other to receive a dose of plastics therebetween, and a closed position in which said punch and
10 said mould cavity interact to form an item by pressing said dose, a supporting arrangement for supporting said dose between said punch and said mould cavity, said supporting arrangement comprising a tubular supporting member (211) having holes (212a) through which air can be injected toward said dose (Da, Db).
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50. Apparatus, comprising a moulding unit having a punch and a mould cavity movable along an axis between an open position in which said punch and said mould cavity are distanced apart from each other to receive a dose of plastics therebetween, and a closed position in which said punch and
20 said mould cavity interact to form an item by pressing said dose, a supporting arrangement for supporting said dose between said punch and said mould cavity, said supporting arrangement comprising a supporting member of thermally substantially non-conductive material.
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51. Apparatus, comprising a moulding unit (3; 3a) having a punch (5; 5a) and a mould cavity (4; 4a) movable between an open position in which said punch (5; 5a) and said mould cavity (4; 4a) are distanced apart from each other to receive a dose (D) of plastics therebetween, and a closed position in which said punch (5; 5a) and said mould cavity (4; 4a) interact to form an item by pressing said dose (D), a dose-delivering mouth (48; 48a; 48b) of an extruder being interposed between said punch (5; 5a) and said moulding
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cavity (4; 4a) in said open position.

52. Apparatus according to claim 51, wherein a severing arrangement (46; 49; 49a) co-operates with said dose-delivering mouth (48; 48a; 48b) so as to sever said dose (D) from said extruder.

53. Apparatus according to claim 52, wherein said severing arrangement (46; 49; 49a) is mounted on said moulding unit (3; 3a).

10 54. Apparatus according to claim 52 or 53, wherein said severing arrangement (46) is rotatable around a respective axis (Z2).

55. Apparatus according to claim 54, wherein said severing arrangement (46) is driven by an independent motor unit.

15 56. Apparatus according to any one of claims 52 to 55, wherein said severing arrangement (46; 49; 49a) is provided with a blade (46) connected to a supporting member (11; 11a) of a supporting arrangement for supporting said dose (D) between said punch (5; 5a) and said mould cavity (4; 4a).

20 57. Apparatus according to any one of claims 52 to 55, wherein said severing arrangement is provided with a knife (49; 49a) mounted on said punch (5; 5a) or on said mould cavity (4; 4a).

25 58. Apparatus, comprising a moulding unit having a punch and a mould cavity movable between an open position in which said punch and said mould cavity are distanced apart from each other and receive a plurality of doses of plastics therebetween, and a closed position in which said punch and said mould cavity interact to form an item by pressing said plurality of doses (Da, Db).

30 59. Apparatus, comprising a moulding unit (3) having a punch (5) and a mould cavity (4) one of which serving as a receiving member for receiving a dose (D) of plastics in an open position, said moulding unit (3) being movable along a path between said open position and a closed position in

which said punch (5) and said mould cavity (4) interact to form an item by pressing said dose (D), channel means (300) being provided to surround said receiving member in said open position along said path.

- 5 60. Apparatus according to claim 59, and comprising a further channel (303) which surrounds transferring means (8) for transferring said dose (D) from an extruder mouth (73) to said moulding unit (3), said further channel (303) extending along a further path leading towards said path.
- 10 61. Apparatus according to claim 59 or 60, and further comprising a supporting arrangement (11) extending externally of said moulding unit (3) and interposed between said punch (5) and said mould cavity (4) for supporting said dose (D).
- 15 62. Apparatus according to claim 61, wherein said supporting arrangement comprises a supporting member (11) of porous material.
63. Apparatus according to claim 61, wherein said supporting arrangement comprises a supporting member (211) having holes (212a) through which fluid can be injected toward said dose (D).
- 20 64. Apparatus according to claim 61, wherein said supporting arrangement comprises a supporting member of thermally substantially non-conductive material.
- 25 65. Apparatus, comprising a pair of rods (11) for supporting a dose (D) of plastics between a punch (5) and a mould cavity (4), said pair of rods (11) being actuatable by a cam arrangement (19) having a first portion (560) for driving said rods (11) in a dose-receiving position in which said dose (D) is received above said rods (11) and a second portion (561) for driving said rods (11) in a dose-pinching position in which said dose (D) is pinched between said rods (11), said second portion (561) being adjacent to said first portion (560).

66. Apparatus according to claim 65, wherein said first portion (560) and said second portion (561) are arranged in sequence along a direction (F), said punch (5) and/or said mould cavity (4) being movable along said direction (F) to open or close said moulding unit (3).
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67. Apparatus according to claim 65 or 66, wherein said cam arrangement (19) comprises a third portion (562) for driving said pair of rods (11) in a dose-delivering position in which said dose (D) is delivered between said punch (5) and said mould cavity (4).
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68. Apparatus according to claim 67, as appended to claim 66, wherein said first portion (560), said second portion (561) and said third portion (562) are arranged in sequence along said direction (F).
- 15 69. Apparatus according to any one of claims 1 to 34, and/or to any one of claims 35 to 37, and/or to any one of claims 38 to 40, and/or to any one of claims 41 to 44, and/or to any one of claims 45 to 47, and/or to claim 48, and/or to claim 49, and/or to claim 50, and/or to any one of claims 51 to 57, and/or to claim 58, and/or to any one of claims 59 to 64, and/or to any one of claims 65 to 68.
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70. A mould compression item comprising a body formed from a plurality of plastic materials having different properties and/or appearance from one another.
- 25 71. An item according to claim 70, wherein said plurality of plastic materials comprises first plastic material and second plastic material.
72. An item according to claim 46, wherein said first and second plastic materials define adjacent portions (251, 252; 312, 313; 316, 318) of a container closure (250; 311; 315).
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73. An item according to claim 72, wherein said adjacent portions (312, 313) are arranged one inside another in said container closure (311).

74. An item according to claim 72, wherein said adjacent portions (251, 252; 316, 318) are arranged side by side in said container closure (250, 315).
- 5 75. An item according to claim 74, wherein a hinge (317) is obtained in one of said adjacent portions.
76. Method, comprising delivering a plurality of doses (Da, Db) of plastics to a moulding unit and pressing together said plurality of doses between a punch and a mould cavity.
- 10 77. Method for compression moulding of plastics items, comprising forming a dose of plastic material in a moulding unit by bringing together a punch and a mould cavity, wherein before said bringing together, said dose is propelled towards either said punch, or said mould cavity.
- 15 78. Method for compression moulding of plastics items, comprising forming a dose (D) of plastics in a moulding unit (3) by bringing together a punch (5) and a mould cavity (4), and further comprising, before said bringing together, resting said dose (D) on a pair of rods, moving said rods close to one another so as to pinch said dose (D), and delivering said dose (D) from said rods to said moulding unit (3), wherein between said resting and said moving said dose (D) remains in contact with said rods.